12-2004

Small Grains: 2005 Variety Recommendations (2004 Crop Performance Results)

Cooperative Extension Service, South Dakota State University

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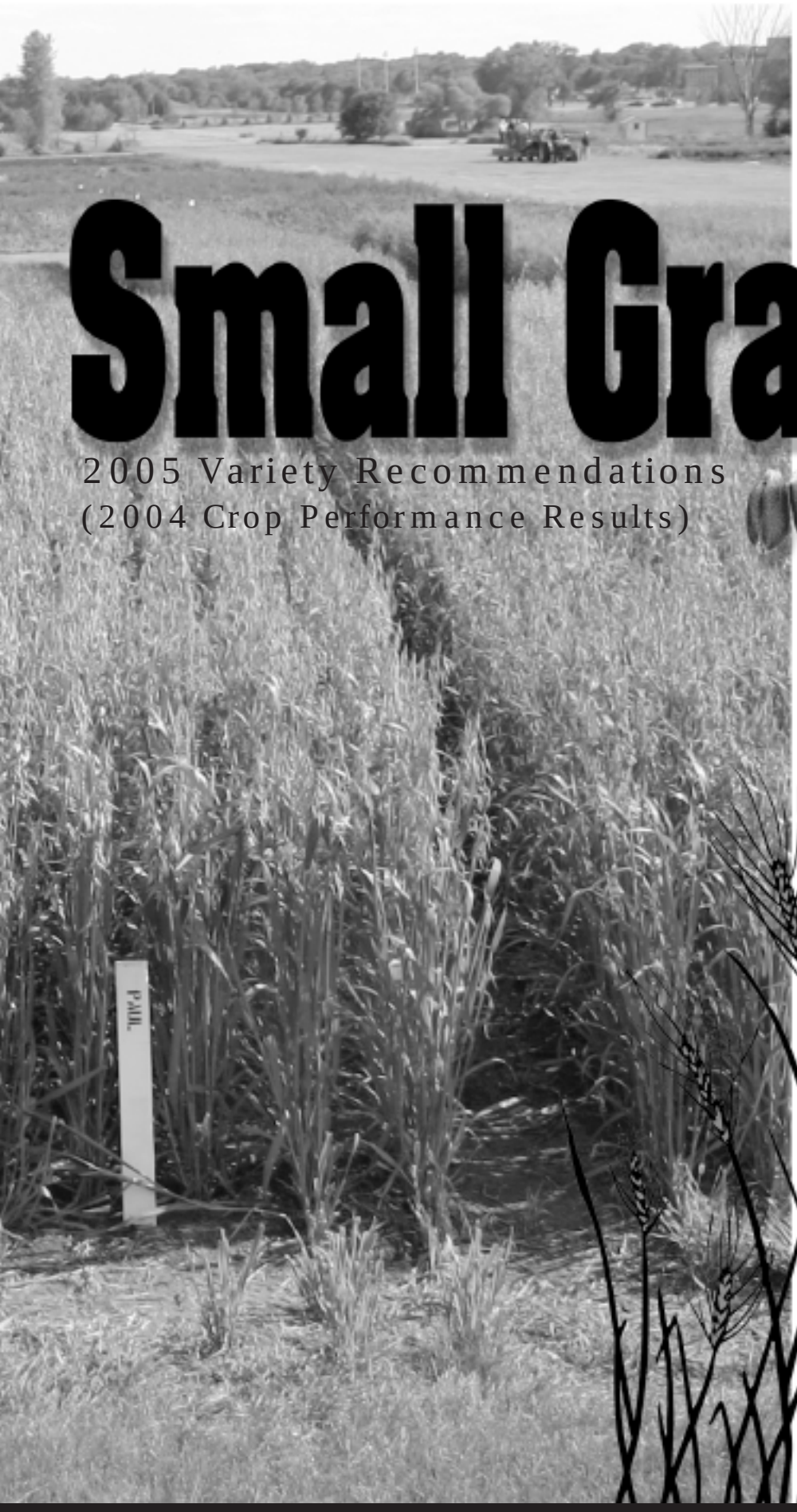


Small Grains

2005 Variety Recommendations
(2004 Crop Performance Results)

Spring Wheat
Oats
Barley
Winter Wheat

South Dakota State University • Cooperative Extension Service • U.S. Department of Agriculture

This report is available on the World-Wide-Web at http://plantsci.sdstate.edu/varietytrials/vartrial.html

Small Grain Variety Recommendations for 2005

Recommendations are based on data obtained from the South Dakota State University Crop Performance Testing (CPT) Program and regional land-grant university nurseries. Variety performance depends on genetics and the environment. Environmental factors—temperature, moisture, plant pests, soil fertility, soil type, and management practices—affect variety performance. Note the performance of recommended varieties in response to environmental conditions is generally better than the performance of other varieties. The better performance of a recommended variety, however, cannot always be guaranteed due to its complex response to the environment. Variety recommendations including the crop adaptation area (CAA) where they are most suited are listed below.

SPRING WHEAT

Recommended:		**Acceptable/Promising:**	
Variety	CAA	Variety	CAA
Briggs @	Statewide	Alsen @	1, 2, 7
Forge @	Statewide	Ingot @	Statewide
Granger @	Statewide	Walworth @	Statewide
Knudson @	Statewide		
Norpro @	1, 2, 7		
Oxen @	Statewide		
Reeder @	Statewide		
Russ @	Statewide		

OATS

Recommended:		**Acceptable/Promising:**	
Variety	CAA	Variety	CAA
Don	1, 4, 5, 6, 7	HiFi	1, 2, 7
Jerry #	Statewide	Morton	1, 2, 7
Loyal +	1, 2, 7	Buff (hulless)	Statewide
Reeves	Statewide		

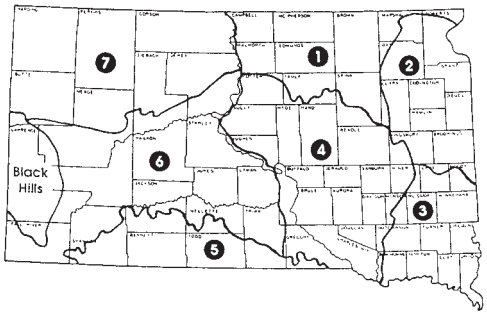
BARLEY

Recommended:		**Acceptable/Promising:**	
Variety	CAA	Variety	CAA
Excel @	1, 2, 4, 6, 7	Conlon @	1, 4, 6, 7
Lacey @	Statewide	Drummond @	Statewide
		Robust @	1, 2, 4, 6, 7
		Haxby @	6, 7 (feed)
		Valier @	6, 7 (feed)

WINTER WHEAT

Recommended:		**Acceptable/Promising:**	
Variety	CAA	Variety	CAA
Alliance @	3, 4*, 5, 6	Expedition @	1*, 4, 5, 6, 7*
Arapahoe @	1*, 3, 4*, 5, 6, 7*	Tandem @	1*, 4*, 5, 6, 7*
Harding @	1*, 2*, 4, 7	Trego (white) @	5, 6, 7*
Jagalene @	1*, 3, 4*, 5, 6, 7*	Wahoo @	3, 4*, 5, 6
Millennium @	1*, 4*, 5, 6, 7		
Wesley	1*, 3, 4*, 5, 6, 7*		

Crop Adaptation Areas for South Dakota
(revised 1992)



PVP non-title V status
+ Exceptional crown rust resistance

American Malting Barley Association approved malting varieties for South Dakota – 2004.

Conlon	Foster	Morex
Drummond	Lacey	Robust
Excel	Legacy	Tradition

@ Plant Variety Protection (PVP) received, applied for, or anticipated; seed sales are restricted to classes of certified seed.
* Plant into protective cover.

Small Grains

2004 South Dakota Test Results: Variety Traits and Yield Averages

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Variety selection is a fundamental element in a sound crop production program. This report contains variety recommendations, descriptions, and yield data for the spring-seeded small grains—hard red spring wheat, oat, and barley—along with the fall seeded small grain, hard red winter wheat.

Key factors in variety selection include yield, yield stability, maturity, straw strength, height, test weight, quality, and disease resistance. Yield is an important factor; however, a variety with good disease resistance, straw strength, and high grain quality may be more profitable in some cases than the highest yielding variety.

Disease resistance information is based on reactions to prevalent races of a disease. Disease resistance is not constant, and new races generally develop over time.

Variety recommendations (inside cover)

The Plant Science Department Variety Recommendation Committee makes small grain variety recommendations annually. Recommendations for a given crop may vary from one crop adaptation area (CAA) to another. CAAs (see map) are based on soil type, elevation, temperature, and rainfall. Varieties are recommended on the basis of growing season, average rainfall, disease frequency, and farming practices common to a crop adaptation area.

Varieties are listed as "Recommended" or "Acceptable/Promising." Varieties exhibiting a high level of agronomic performance are listed as "Recommended." Each test entry must meet the minimum criteria listed in Table A before it is eligible for the "Recommended" list. Varieties listed as "Acceptable/Promising" have performed well but do not merit the "Recommended" list, or are new varieties with a high performance potential but do not meet the 3-year criteria (Table A) needed to make the "Recommended" list. A variety needs 2 years and six location-years in the SDSU crop performance test trials and/or regional nurseries before it is eligible for the "Acceptable/Promising" list.

Certified seed is the best source of seed and the only way farmers can be assured of the genetic purity of the variety purchased.

How to use this information

Use this report to select small grain varieties for South Dakota. Use this bulletin as follows:

1. Check the variety-crop adaptation area (CAA) designations for the "Recommended" and "Acceptable/Promising" lists on the preceding pages. Compare these variety-CAA designations with the CAA map of South Dakota. **Identify the varieties suggested for your CAA.**

2. **Evaluate the varieties you selected for desirable traits.** Descriptive information (traits tables 3, 6, 9, and 12) is updated as changes occur. This information is obtained from the SDSU Crop Performance Testing Program and from research plots maintained by plant breeders and plant pathologists. Data for protein, height, and bushel (test) weight are obtained from every location when possible. Disease resistance continually changes; therefore, new information is reported as it becomes available. To evaluate maturity, compare the relative maturity

(heading) rating of each variety to the reference or check variety given. The *Fusarium* head blight tolerance ratings for hard red spring wheat are also given. Note that the head blight ratings show **there is presently no variety resistance to this disease.** It does, however, indicate **some varieties are more tolerant of the disease than others.**

3. **Evaluate each variety you select for yield performance**. Yields are obtained from the SDSU Crop Performance Testing Program. Both 1- and 3-year average yields for each variety tested are included for each test location if the variety was tested for 3 or more years. Yield values for each variety and location average and for each location least-significant-difference (LSD) value are rounded to the nearest bushel per acre.

Location test yield averages, the high yield averages, LSD values, and coefficient of variation (CV) values for each variety tested are listed below each location yield column. These statistics are calculated from data that include both released varieties and experimental lines. Only data for released varieties are reported; therefore, the test average for a location yield column may not equal the average for the individual yields you observe in the table. Likewise, the test LSD values obtained from the location data are also based on both varieties and experimental lines. Varieties and experimental lines are included in the test results so you can see how known varieties compare to experimental lines that may be released in the near future.

Always compare yields from the same period of time. Compare 1-year yields with other 1-year yields, and 3-year yields with other 3-year yields.

Next, determine whether the data are valid. The CV value listed at the bottom of each yield column is a measure of experimental error. **Yield tests with a CV of 20% or higher contain higher amounts of experimental error than tests with a CV of 10% or less. Test sites with a CV greater than 15% are not included in the calculations for yield stability discussed later. In addition, the top performance group for yield or other agronomic measurements obtained for that site are not indicated in the table because the validity of the yield differences among the varieties is uncertain as a result of the high level of experimental error.**

Use LSD values to evaluate yield differences between varieties. The LSD value indicates if one variety really out yields another. If the yield difference between two varieties is greater than the LSD value, the varieties differ in yield. If the yield difference is equal to or less than the LSD value, the varieties do not statistically differ in yield.

The LSD value can be used to determine the top yield group for each location. For example, at each location the variety with the highest numerical yield is identified using 1- or 3-year averages. The reported test LSD value is subtracted from the highest yielding variety. Varieties with yields greater than this value (highest yield minus test LSD) are in the top yield group at that location. For example, in hard red spring wheat the top yielding entry at Brookings for 2004 was an experimental line (not reported) that yielded 72 bu/acre. Subtracting 5 bu/acre (the rounded-off LSD value) from the highest yield entry of 72 bu/acre gives 67 bu/acre. Therefore, all varieties listed in that column yielding 68 bushels or higher are in the top yield group. However, since the LSD values and reported yield averages are rounded off to the nearest whole bushel, we can say that 67 bu/acre is the more appropriate LSD value in this case. For convenience, averages for varieties in the top yield group at each location are underlined. Sometimes, underlined averages may be absent within a yield column. This indicates the top yielding entries are not reported because they are experimental, not released varieties.

Sometimes, an LSD value is not given and the designation ^NS is listed. This indicates yield differences were not significant (NS) or yield differences could not be detected. Therefore, all the varieties have a similar yielding potential and are considered to be in the top yield group. In contrast, a high level of experimental error is indicated by a high CV value. In such a case the top yield group is not determined.

When evaluating yield performance, remember that environmental conditions at a test location seldom repeat themselves from year to year. Therefore, look at yield data from as many trial locations and years as possible.

Look at the performance or "yield stability" of a variety over several locations. A simple way of evaluating yield stability is to see how often a variety is in the top yield group over all test locations. For convenience, the top yield percentage or the percentage of locations where a variety is in the top yield group has been calculated. **The top yield percentage for each variety of hard red spring wheat is reported in table 1c, for oats in table 4c, and for barley in table 7c.** Top yield percentages for hard red winter wheat are not reported because winter hardiness greatly influences spring stands and makes it impossible to report valid top yield percentages for more than 1 year.

A variety exhibiting a relatively high top yield percentage will appear in the top yield group at many but not necessarily all locations. For example, a variety with a top yield percentage of 50% or more exhibits good yield stability. In contrast, a top yield percentage of 20% or less indicates low yield stability.

Varieties with a high top yield percentage have the ability to adapt to a wide range of environmental conditions across many locations. In contrast, varieties with a low top yield percentage typically adapt to a narrow range of environments. **Look for varieties with a relatively high top yield percentage of 50% or higher if possible.**

Origin of varieties tested

Public varieties were released from state agricultural experiment stations. Abbreviations for each include:

Minnesota – MN
Illinois – IL
Kansas – KS
Montana – MT
Nebraska – NE
North Dakota – ND
South Dakota – SD
Texas – TX
Wisconsin – WI

Many public varieties were developed and released jointly by one or more experiment stations or USDA. Proprietary varieties were released by commercial companies. Company abbreviations for these include:

AgriPro Wheat, Inc. – AW
Busch Agricultural Resources, Inc. – BARI
Westbred, LLC. – WB
North Star Genetics – NSG

Trial methods

A random complete block design is used in all trials. Plots are harvested with a small-plot combine. Plot size differs between the East River and West River locations. East River plots are 5 feet wide and either 12 or 14 feet long. West River plots measure 5 feet wide and 25 feet long. Plots consist of drill strips with 7- or 8-inch spacing at East River locations and 10-inch spacing at West River locations. Trial locations are listed in Table B. Yield means are generated from four variety replications per location per year.

Fertility and weed control programs differed between the East and West River locations. East River plots were fertilized with 60 lb per acre of 18-46-0 (10.8 lb of N and 27.6 lb of phosphorus per acre) down the seed tube at seeding. In addition, at these locations a post-emergence application of Bronate (1.0 pint) was applied on the spring wheat, oats, and barley plots. West River plots were fertilized with 6 gal of 10-34-0 per acre (6.6 lb of nitrogen and 24 lb of phosphorus per acre) at seeding. Post-emergence applications of 0.10 oz of Ally herbicide per acre plus 6 oz active ingredient per acre of 2,4-D (wheat) and 1 pint of Bronate (oats and barley) were applied at the 3- to 5-leaf stage.

Since seed size can vary greatly among varieties, a seed count is conducted on each entry and all seeding rates are adjusted accordingly. At East River locations the adjusted seeding rates are 28 pure live seeds per square foot compared to 22 pure live seeds per square foot at West River locations. Under good seedbed preparation and favorable conditions these adjusted seeding rates result in seedling densities of about 25 and 20 plants per square foot at the East and West River locations, respectively. This results in a final stand of about 1.1 million and 870,000 plants per acre, respectively. If you have a poor seedbed, increase the spring grain seeding rate to 32 and 25 seeds per square foot at East and West River locations, respectively. If planting is delayed until May 1 or later, increase the seeding rates to 35 and 28 seeds per square foot at East and West River locations, respectively. Seeding dates are listed in Table B.

Performance trial highlights

HRS Wheat (Tables 1a – 1c). The top performing varieties for year 2004 (variety and top yield percentage) were **Briggs at 67%; Knudson and Norpro at 44%; and Steele-ND, Oxen, and Mercury at 33%** (table 1c). This means these varieties were in the top yielding group at 67%, 44%, and 33% of the test locations for 2004. The best top yield varieties over the past 3 years were **Briggs, Granger, and Knudson at 100%; Forge, Oxen, Russ, Reeder, and Norpro at 83%; and Walworth, Dapps, Oklee, and Alsen at 33%** of the test locations. The top bushel weight group consisted of the varieties **Ingot, Granger, Granite, and Mercury at 50%** of the locations in 2004. The old check variety **Chris** tended to be the tallest variety across all locations in 2004.

Oat (Tables 4a – 4c). In 2004, **Morton and HiFi** exhibited a top yield percentage of **75%** and **Jerry and Loyal** a top yield percentage of **38%**. Over the past 3 years the highest top yield percentages were **100%** for the varieties **Don, Reeves, Jerry, Morton, Loyal, and HiFi.** In 2004, the variety **Hytest** had the best bushel weight average across all locations, while the varieties **Loyal and HiFi** tended to have the lowest bushel weight average among the standard varieties (tables 5a-5c). Overall, the hulless varieties **Buff, Stark, and Paul** had the highest bushel weight average and the lowest yield average across all locations.

Barley (Tables 7a – 7c). In 2004, the best top yield group percentages for yield were **Eslick at 100%; Lacey and Legacy at 75%; Haxby and Valier at 63%; and Conlon, Tradition, and Drummond at 50%** of the locations tested. The better varieties over the past 3 years were **Lacey and Excel at 100%; Drummond at 67%; and Conlon at 50%** of the test locations. The two-row varieties **Haxby, Eslick,**

and Valier tested 1 to 3 pounds higher in bushel weight than the other varieties across locations (tables 8a-8c). Either **Robust or Legacy or both** were the tallest varieties across all locations.

HRW Wheat (Tables 4a – 4c). In 2004, the better yielding varieties were **Wahoo, Millennium, and Harding;** followed by the variety **Arapahoe**. For the past 3 years, the best yielding varieties were **Wahoo, Jagalene, Arapahoe, Millennium, Tandem, and Harding**. In 2004, the best bushel weight varieties were **Jagalene and Trego** (a white wheat), followed by **Expedition, Tandem, Crimson, Nekota, and Alliance**. Severely limited subsoil moisture and a lack of timely seasonal moisture were the major factors in the western winter wheat production areas of South Dakota again this year.

Note the coleoptile length of the various varieties included in the variety traits table (table 12). Coleoptile length is important because it affects how deep the seed may be planted. A long coleoptile variety can be planted relatively deeper than a short coleoptile variety. The coleoptile length of 3.2 inches for Harding is used as the standard (100%) for comparisons. The coleoptile length for the varieties Tandem and Crimson are slightly longer than for Harding; while the coleoptile length for the varieties Wahoo, Jagalene, Expedition, Nekota, Arapahoe, Trego~W, Alliance, Millennium, Wesley, and Wendy are shorter compared to Harding.

Variety Release/Recommendation Committee

The Variety Release/Recommendation Committee is made up of plant breeders, pathologists, research scientists, Extension agronomists, and managers of the Seed Certification Service and Foundation Seed Stocks Division.

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K. Matkins (Sturgis)
W. Miller (Oelrichs)
L. Novotny (Martin)
R. Rosenow (Ralph)
M. Stiegelmeier (Selby)
R. Van Der Pol (Platte)
R. Seidel (Bison)
Nelson Brothers (Miller)
R. and L. Haskins (Hayes)

Table A. Minimum criteria required for the recommended list in this publication.

Trait	Crop			
	HRS Wheat	Oats	Barley	HRW Wheat
Yield	3/15*	3/15	3/12	3/15
Bushel weight	3/15	3/15	3/12	3/15
Height	3/15	3/15	3/12	3/15
Lodging	WA	WA	WA	WA
Disease reaction	A	A	A	A
Protein	3/15	-	3/12	3/15
Quality data#	2/4	WA	WA	WA
Unigue traits$	WA	WA	WA	WA

* 3 years/15 location-years. # includes milling and baking.
$ traits that affect production and marketing.
A= annually, WA= when available.

Table B. 2004 Small grain seeding dates by crop and location.

Location				
	HRS Wheat	Oats	Barley	HRW Wheat
	seeding date			
Beresford	-	Apr 5	-	-
Bison	Apr 12	Apr 12	Apr 12	Abandoned
Brookings	Apr 7	Apr 7	Apr 7	Sept 9
Brown Co.	Apr 2	Apr 2	Apr 2	-
Pierre-DL	-	-	-	Sept 17
Hayes	-	-	-	Abandoned
Highmore	-	-	-	Sept 16
Miller	Apr 5	Apr 5	Apr 5	-
Martin	-	-	-	Abandoned
Oelrichs	-	-	-	Abandoned
Platte	-	-	-	Sept 20
Ralph	Apr 12	Apr 12	Apr 12	-
Selby	Apr 6	Apr 6	Apr 6	-
SouthShore	Apr 12	Apr 12	Apr 12	Sept 4
Spink Co.	Apr 11	-	-	-
Sturgis	-	-	-	Sept .16
Tripp Co.	-	-	-	Sept 18
Wall	Apr 3	Apr 3	Apr 3	Sept 18

Table 1a. Hard red spring yield results, eastern South Dakota locations, 2003-2004.

		Eastern Location Yield Averages (13% moisture)					
		Brookings		South Shore		Eastern Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Ingot	(1)	45	49	42	41	44	45
Trooper	(1)	50	.	48	.	49	.
Forge	(1)	47	53	49	43	48	48
Walworth	(2)	52	54	46	41	49	48
Briggs	(2)	68	57	61	48	65	53
Granger	(2)	65	55	55	46	60	51
Freyr	(3)	60	.	55	.	58	.
Dapps	(4)	58	52	49	40	54	46
Steele-ND	(4)	62	.	59	.	61	.
Oklee	(4)	58	49	57	42	58	46
Knudson	(4)	68	54	58	45	63	50
Oxen	(4)	52	48	48	42	50	45
Russ	(4)	51	53	49	44	50	49
Reeder	(5)	49	51	50	45	50	48
Norpro	(5)	54	52	43	42	49	47
Chris,CK	(5)	38	38	36	33	37	36
Dandy	(7)	55	.	45	.	50	.
Alsen	(6)	50	47	51	43	51	45
Mercury	(7)	56	.	54	.	55	.
Granite	(7)	54	47	43	40	49	44
Polaris	(9)	50	.	47	.	49	.
Test avg.:		57	51	52	43		
High yield:		72	61	63	49		
# LSD(.05):		5	10	5	7		
## TPG-value:		67	51	58	42		
### CV:		6	7	6	7		

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 1b. Hard red spring wheat yield results, central South Dakota locations, 2003-2004.

		Central Location Yield Averages (13% moisture)								Central Averages	
		Miller		Spink Co.		Selby		Brown Co.			
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Ingot	(1)	54	.	54	47	36	42	63	47	52	45
Trooper	(1)	59	.	64	.	48	.	73	.	61	.
Forge	(1)	58	.	65	53	51	50	67	50	60	51
Walworth	(2)	58	.	63	50	52	49	65	49	60	49
Briggs	(2)	63	.	72	54	57	51	72	54	66	53
Granger	(2)	51	.	71	57	50	50	76	53	62	53
Freyr	(3)	60	.	57	.	49	.	75	.	60	.
Dapps	(4)	50	.	64	48	48	43	66	48	57	46
Steele-ND	(4)	58	.	68	.	50	.	72	.	62	.
Oklee	(4)	55	.	63	50	52	44	74	49	61	48
Knudson	(4)	60	.	72	56	51	47	76	54	65	52
Oxen	(4)	62	.	65	55	52	45	76	53	64	51
Russ	(4)	59	.	62	52	40	46	72	51	58	50
Reeder	(5)	61	.	66	53	41	46	74	51	61	50
Norpro	(5)	61	.	63	51	54	49	75	51	63	50
Chris,CK	(5)	47	.	44	40	43	38	51	38	46	39
Dandy	(7)	57	.	66	.	51	.	69	.	61	.
Alsen	(6)	54	.	63	52	43	41	69	52	57	48
Mercury	(7)	62	.	62	.	51	.	79	.	64	.
Granite	(7)	53	.	67	50	46	47	72	49	60	49
Polaris	(9)	53	.	52	.	45	.	70	.	55	.
Test avg.:		57	.	65	52	49	46	72	50		
High yield:		66	.	74	60	57	51	83	57		
# LSD(.05):		5	.	7	6	7	9	5	7		
## TPG-value:		61	.	67	54	50	42	78	50		
### CV:		6	.	8	8	10	9	5	7		

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 1c. Hard red spring wheat yield results, western South Dakota locations, 2003-2004.

		Western Location Yield Averages (13% moisture)											
		Wall		Bison		Ralph		Western Averages		State		State Top Yield Percentage$	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	9 Loc 2004	6 Loc 3-Yr
Ingot	(1)	31	29	25	.	50	.	35	.	44	43	0	33
Trooper	(1)	32	.	26	.	52	.	37	.	50	.	0	.
Forge	(1)	36	30	31	.	57	.	41	.	51	47	22	83
Walworth	(2)	37	31	28	.	57	.	41	.	51	46	22	50
Briggs	(2)	36	27	28	.	52	.	39	.	57	49	67	100
Granger	(2)	34	29	30	.	55	.	40	.	54	48	22	100
Freyr	(3)	35	.	27	.	52	.	38	.	52	.	0	.
Dapps	(4)	33	26	23	.	46	.	34	.	49	43	0	50
Steele-ND	(4)	35	.	27	.	56	.	39	.	54	.	33	.
Oklee	(4)	31	28	28	.	45	.	35	.	51	44	11	50
Knudson	(4)	29	26	24	.	55	.	36	.	55	47	44	100
Oxen	(4)	37	31	27	.	57	.	40	.	53	46	33	83
Russ	(4)	38	30	29	.	57	.	41	.	51	46	11	83
Reeder	(5)	34	30	30	.	57	.	40	.	51	46	11	83
Norpro	(5)	40	28	31	.	61	.	44	.	54	46	44	83
Chris,CK	(5)	33	26	26	.	42	.	34	.	40	36	0	17
Dandy	(7)	34	.	27	.	54	.	38	.	51	.	11	.
Alsen	(6)	30	27	27	.	54	.	37	.	49	44	0	50
Mercury	(7)	29	.	26	.	57	.	37	.	53	.	33	.
Granite	(7)	37	28	27	.	54	.	39	.	50	44	22	33
Polaris	(9)	37	.	34	.	60	.	44	.	50	.	22	.
Test avg.:		35	28	29	.	55	.						
High yield:		40	31	39	.	63	.						
# LSD(.05):		4	^NS	4	.	4	.						
## TPG-value:		36	26	35	.	59	.						
### CV:		8	9	10	.	6	.						

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
$ Percent of test locations a variety appears in the top performance group for yield.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 2a. Hard red spring wheat averages for bushel weight, grain protein, and height, eastern South Dakota locations for 2004.

		Eastern Location Averages for bu.wt., grain protein, and height								
		Brookings			South Shore			Eastern Averages		
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Ingot	(1)	57	13.2	39	57	14.0	41	57	13.6	40
Trooper	(1)	56	13.0	32	54	13.3	33	55	13.2	32
Forge	(1)	55	12.8	37	57	13.7	37	56	13.3	37
Walworth	(2)	58	13.1	37	56	13.9	38	57	13.5	37
Briggs	(2)	60	13.6	37	58	14.5	38	59	14.1	37
Granger	(2)	59	13.2	39	58	14.5	41	58	13.9	40
Freyr	(3)	59	13.3	36	57	15.0	39	58	14.2	38
Dapps	(4)	59	14.1	40	57	15.2	40	58	14.7	40
Steele-ND	(4)	59	13.8	38	57	14.6	39	58	14.2	38
Oklee	(4)	59	13.5	34	58	13.1	38	59	13.3	36
Knudson	(4)	57	13.4	35	56	13.8	36	57	13.6	35
Oxen	(4)	55	13.0	35	55	14.3	35	55	13.7	35
Russ	(4)	56	13.6	39	56	13.6	39	56	13.6	39
Reeder	(5)	56	13.1	37	56	14.1	38	56	13.6	37
Norpro	(5)	57	13.7	35	51	14.4	35	54	14.1	35
Chris,CK	(5)	54	13.6	43	53	15.2	44	53	14.4	44
Dandy	(7)	59	12.6	37	57	13.3	37	58	13.0	37
Alsen	(6)	58	14.2	35	57	14.1	39	57	14.2	37
Mercury	(7)	59	12.9	32	58	15.2	33	58	14.1	33
Granite	(7)	61	14.0	36	56	14.8	36	59	14.4	36
Polaris	(9)	54	13.1	38	50	13.1	37	52	13.1	38
Test avg.:		58	13.3	37	56	13.9	38			
High-value:		62	14.8	43	60	15.2	44			
# LSD(.05):		2	.	1	2	.	2			
## TPG-value:		60	.	42	58	.	42			
### CV:		3	.	2	3	.	5			

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
\# LSD, the amount values in a column must differ to be significantly different.
\## TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
\### Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 2b. Hard red spring wheat averages for bushel weight, grain protein, and height, central South Dakota locations for 2004.

		Central Location Averages for bu.wt., grain protein, and height														
		Miller			Spink Co.			Selby			Brown Co.			Central Averages		
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Ingot	(1)	55	16.3	39	58	14.4	40	61	14.4	41	60	14.2	43	59	14.8	41
Trooper	(1)	52	15.0	29	58	14.4	31	57	14.6	31	60	13.4	36	57	14.4	32
Forge	(1)	51	14.9	35	56	14.3	36	59	13.4	41	59	13.6	39	56	14.1	37
Walworth	(2)	52	13.4	34	57	14.5	35	59	14.3	38	59	13.4	40	57	13.9	37
Briggs	(2)	53	14.8	34	58	15.0	36	59	14.9	38	60	14.3	40	58	14.8	37
Granger	(2)	53	14.0	37	57	14.7	40	60	14.8	41	61	14.2	42	58	14.4	40
Freyr	(3)	53	15.3	34	56	14.0	37	59	13.7	36	60	14.0	42	57	14.3	37
Dapps	(4)	51	16.9	40	58	15.9	40	58	16.2	44	59	15.2	41	57	16.1	41
Steele-ND	(4)	53	16.0	34	58	14.9	40	59	15.0	39	58	14.7	41	57	15.2	38
Oklee	(4)	54	16.5	34	58	15.2	34	60	15.3	37	59	14.3	38	58	15.3	36
Knudson	(4)	53	15.3	33	58	14.0	34	59	14.4	34	60	13.2	38	57	14.2	34
Oxen	(4)	51	13.7	33	54	14.5	34	57	14.2	35	57	13.6	39	55	14.0	35
Russ	(4)	53	14.8	37	56	14.6	39	59	14.4	40	57	14.4	39	56	14.6	39
Reeder	(5)	53	15.4	36	57	14.9	38	58	14.5	36	59	14.5	42	57	14.8	38
Norpro	(5)	51	15.0	31	56	14.7	34	59	14.7	34	57	13.9	37	56	14.6	34
Chris,CK	(5)	52	16.7	40	55	15.3	48	58	15.2	46	55	15.1	45	55	15.6	45
Dandy	(7)	54	14.6	39	58	14.2	38	59	14.2	39	61	13.6	40	58	14.2	39
Alsen	(6)	53	14.6	33	58	15.4	36	59	15.3	37	59	14.6	40	57	15.0	36
Mercury	(7)	54	15.6	30	57	14.1	30	60	14.2	31	60	13.1	35	58	14.3	31
Granite	(7)	54	17.9	34	60	15.8	34	60	15.6	36	61	15.3	38	59	16.2	35
Polaris	(9)	52	16.7	35	55	13.8	37	57	13.6	36	57	13.9	40	55	14.5	37
Test avg.:		53	15.2	35	57	14.5	37	59	14.3	38	59	14.0	40			
High-value:		55	17.9	40	60	15.9	48	61	16.2	46	61	15.3	45			
# LSD(.05):		1	.	3	2	.	2	1	.	2	2	.	2			
## TPG-value:		54	.	37	58	.	46	60	.	44	59	.	43			
### CV:		2	.		2	.	4	1	.	4	3	.	4			

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
\# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 2c. Hard red spring wheat averages for bushel weight, grain protein, and height, western South Dakota locations for 2004.

		Western Location Averages for bu.wt., grain protein, and height														
		Wall			Bison			Ralph			Western Averages			State Avg.		
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Ingot	(1)	62	17.3	25	60	17.5	28	62	14.7	35	61	16.5	29	59	15.1	37
Trooper	(1)	64	16.5	20	59	16.3	23	59	13.4	26	61	15.4	23	58	14.4	29
Forge	(1)	63	16.9	24	59	15.7	26	62	12.1	31	61	14.9	27	58	14.2	34
Walworth	(2)	61	16.6	23	58	17.4	28	59	12.2	29	59	15.4	26	58	14.3	33
Briggs	(2)	62	18.2	24	58	17.3	27	59	14.2	31	60	16.6	27	59	15.2	34
Granger	(2)	62	16.3	24	60	17.1	27	61	13.5	35	61	15.6	29	59	14.7	36
Freyr	(3)	63	16.1	26	59	17.8	29	61	14.4	30	61	16.1	28	59	14.8	34
Dapps	(4)	62	18.3	25	57	18.5	29	59	16.7	35	59	17.8	30	58	16.3	37
Steele-ND	(4)	63	17.7	25	58	18.4	29	60	15.5	33	60	17.2	29	58	15.6	35
Oklee	(4)	61	17.4	21	59	18.4	24	59	13.9	28	60	16.6	24	59	15.3	32
Knudson	(4)	62	16.7	22	59	17.4	25	60	16.5	29	60	16.9	25	58	15.0	32
Oxen	(4)	61	17.2	23	57	17.8	25	60	13.3	29	59	16.1	25	56	14.6	32
Russ	(4)	61	16.9	25	56	16.5	28	59	15.7	32	59	16.4	28	57	14.9	35
Reeder	(5)	63	17.4	24	58	17.1	26	59	13.8	31	60	16.1	27	58	15.0	34
Norpro	(5)	63	16.1	22	60	18.1	27	59	14.6	28	61	16.3	25	57	15.0	31
Chris,CK	(5)	61	18.0	28	57	17.5	33	58	16.9	36	59	17.5	32	56	15.9	40
Dandy	(7)	62	16.6	25	58	16.0	27	62	15.3	31	61	16.0	28	59	14.5	35
Alsen	(6)	62	17.3	23	61	17.5	27	59	14.2	31	61	16.3	27	59	15.2	33
Mercury	(7)	61	17.2	19	59	16.9	23	61	11.9	26	60	15.3	23	59	14.6	29
Granite	(7)	65	16.9	24	60	17.2	24	60	14.3	29	61	16.1	26	60	15.8	32
Polaris	(9)	63	16.2	24	59	14.8	25	58	12.0	31	60	14.3	27	56	14.1	34
Test avg.:		62	16.7	24	58	16.9	27	60	13.7	31						
High-value:		65	18.3	28	61	18.5	33	62	16.9	38						
# LSD(.05):		1		2	2		3	1		3						
## TPG-value:		64		26	59		30	61		35						
### CV:		1		7	3		7	2		4						

* Heading, the relative difference in days to heading, compared to the variety- Briggs.
\# LSD, the amount values in a column must differ to be significantly different.
\## TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
\### Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 3. Origin, lodging resistance, and disease reactions for hard red spring wheat entries for year 2004.

Variety	(Hdg.)*	Origin	Ldg.# Resis.	Disease reaction+ Rust Stripe	Rust Leaf	Rust Stem	Fusarium Head Blight	PVP** Status
Forge	(1)	SD-97	G	MR	MS	R	M~	Yes
Ingot	(1)	SD-98	G	MR	MS	R	MS^	Yes
Trooper	(1)	WB-04	G	MS	MR	R	MS	Yes
Briggs	(2)	SD-02	G	MR	R	R	MS^	Yes
Granger	(2)	SD-04	G	R	R	R	M	***
Walworth	(2)	SD-01	G	S	MS	R	MS^	Yes
Freyr	(3)	AW-05	G	R	MR	MR	MR	Yes
Dapps	(4)	ND-03	VG	MR	MR	R	S	Yes
Knudson	(4)	AW-01	G	MS	MR	R	MS~	Yes
Oklee	(4)	MN-03	-	R	MS	R	MS^	***
Oxen	(4)	SD-96	G	MR	MR	R	MS~	Yes
Russ	(4)	SD-95	G	R	MR	R	MS~	Yes
Steele-ND	(4)	ND-04	G	R	R	R	MR~	Yes
Chris,CK	(5)	MN-65	P	-	MS	R	S	No
Norpro	(5)	AW-00	VG	MR	MR	R	MS	Yes
Reeder	(5)	ND-99	VG	MR	MS	R	MS~	Yes
Alsen	(6)	ND-00	G	R	MR	R	MR~	Yes
Dandy	(7)	NSG-99	VG	-	S	-	MS	Yes
Granite	(7)	WB-02	G	MS	S	MS	S	Yes
Mercury	(7)	NSG-99	VG	-	MS	R	S	Yes
Polaris	(9)	NSG-03	G	-	-	-	-	Yes

* Heading, the relative difference in days to heading, compared to Briggs.
\# E= excellent, G= good, VG= very good, F= fair, P=poor.
\+ R= resistant, MR= moderately resis., M= intermediate, MS= mod. susceptible, S= susc.
^ Indicates disease reaction changed from last year.
~ Consistent tolerance to head blight in grain yield and quality.
** Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.
*** PVP application pending or anticipated.

Table 4a. Oat yield results, eastern South Dakota locations, 2003-2004.

		Eastern Location Yield Averages (13% moisture)							
		Brookings		South Shore		Beresford		Eastern Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Standard types:									
Don	(1)	121	115	138	102	153	114	137	110
Reeves	(2)	123	114	135	99	147	106	135	106
Hytest	(4)	126	110	132	91	112	86	123	96
Jerry	(5)	138	120	151	105	154	116	148	114
Morton	(7)	174	126	163	105	161	105	166	112
Loyal	(8)	164	130	155	102	146	103	155	112
HiFi	(8)	174	132	171	103	161	109	169	115
Hulless types:									
Buff Hls	(3)	114	95	131	87	113	88	119	90
Stark Hls	(6)	117	.	130	.	112	.	120	.
Paul Hls	(7)	105	80	117	63	76	53	99	65
Test avg.:		146	114	145	95	148	98		
High yield:		174	132	171	105	174	116		
# LSD(.05):		14	23	10	21	20	20		
## TPG-value:		160	109	161	84	154	96		
### CV:		7	6	5	7	9	8		

* Heading, the relative difference in days to heading, compared to the variety- Don.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 4b. Oat yield results, central South Dakota locations, 2003-2004.

		Central Location Yield Averages (13% moisture)							
		Miller		Selby		Brown Co.		Central Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Standard types:									
Don	(1)	114	.	87	83	110	.	104	.
Reeves	(2)	105	.	99	82	114	.	106	.
Hytest	(4)	107	.	88	74	112	.	102	.
Jerry	(5)	120	.	116	97	128	.	121	.
Morton	(7)	126	.	115	94	140	.	127	.
Loyal	(8)	115	.	112	91	128	.	118	.
HiFi	(8)	130	.	130	99	149	.	136	.
Hulless types:									
Buff Hls	(3)	102	.	95	75	74	.	90	.
Stark Hls	(6)	100	.	92	.	95	.	96	.
Paul Hls	(7)	86	.	93	57	90	.	90	.
Test avg.:		119	.	108	84	124	.		
High yield:		133	.	137	99	150	.		
# LSD(.05):		14	.	13	18	14	.		
## TPG-value:		119	.	124	81	136	.		
### CV:		8	.	9	7	8	.		

* Heading, the relative difference in days to heading, compared to the variety- Don.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 4c. Oat yield results, western South Dakota locations, 2003-2004.

		Western Location Yield Averages (13% moisture)									
		Wall		Bison		Western Averages		State	Avg.	State Top Yield Percentage$	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	8 Loc 2004	5 Loc 3-Yr
Standard types:											
Don	(1)	51	58	56	.	54	.	104	94	0	100
Reeves	(2)	52	55	51	.	52	.	103	91	0	100
Hytest	(4)	50	52	57	.	54	.	98	83	0	60
Jerry	(5)	58	60	63	.	61	.	116	100	38	100
Morton	(7)	55	51	61	.	58	.	124	96	75	100
Loyal	(8)	56	51	68	.	62	.	118	95	38	100
HiFi	(8)	63	55	61	.	62	.	130	100	75	100
Hulless types:											
Buff Hls	(3)	46	46	49	.	48	.	91	78	0	20
Stark Hls	(6)	37	.	55	.	46	.	92	.	0	.
Paul Hls	(7)	27	29	45	.	36	.	80	56	0	0
Test avg.:		51	51	59	.						
High yield:		63	60	78	.						
# LSD(.05):		8	10	11	.						
## TPG-value:		55	50	67	.						
### CV:		10	9	13	.						

* Heading, the relative difference in days to heading, compared to the variety- Don.
$ Percent of test locations a variety appears in the top performance group for yield.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 5a. Oat averages for bushel weight, grain protein, and height, eastern South Dakota locations for 2004.

		Eastern Location Averages for bu.wt., grain protein, and height									Eastern Averages		
		Brookings			South Shore			Beresford					
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Standard types:													
Don	(1)	36	12.1	40	36	12.9	38	40	15.9	40	37	13.6	39
Reeves	(2)	36	13.0	47	36	14.1	42	41	18.3	44	38	15.1	44
Hytest	(4)	38	14.4	49	40	15.6	43	43	19.8	44	40	16.6	45
Jerry	(5)	35	12.5	47	38	13.9	44	42	17.9	44	38	14.8	45
Morton	(7)	34	9.2	51	36	13.6	46	38	16.4	45	36	13.1	47
Loyal	(8)	33	11.7	48	35	16.0	43	38	18.1	46	36	15.3	46
HiFi	(8)	33	9.4	49	37	13.1	42	38	16.2	44	36	12.9	45
Hulless types:													
Buff Hls	(3)	40	12.6	43	43	14.6	39	51	20.5	42	45	15.9	41
Stark Hls	(6)	34	9.4	47	42	14.6	43	43	18.9	44	39	14.3	45
Paul Hls	(7)	35	12.1	50	43	14.9	42	46	21.1	43	41	16.0	45
Test avg.:		35	11.8	47	38	14.3	43	42	17.8	44			
High-value:		40	14.4	51	43	16.0	47	51	21.1	48			
#LSD(.05):		2	.	2	2	.	2	1	.	2			
## TPG-value:		38	.	49	41	.	45	50	.	46			
### CV:		3	.	3	3	.	3	2	.	4			

* Heading, the relative difference in days to heading, compared to the variety- Don.
\# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 5b. Oat averages for bushel weight, grain protein, and height, central South Dakota locations for 2004.

		Central Location Averages for bu.wt., grain protein, and height									Central Averages		
		Miller			Selby			Brown Co.					
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Standard types:													
Don	(1)	38	15.2	32	39	16.1	.	38	13.6	39	38	15.0	35
Reeves	(2)	40	15.6	39	40	17.6	.	39	12.8	47	40	15.3	43
Hytest	(4)	41	17.2	40	40	19.4	.	39	15.5	46	40	17.4	43
Jerry	(5)	39	15.5	38	40	16.8	.	38	13.3	47	39	15.2	43
Morton	(7)	38	15.0	41	36	16.2	.	38	13.7	52	37	15.0	46
Loyal	(8)	38	14.4	40	35	18.1	.	37	13.5	47	37	15.3	44
HiFi	(8)	37	14.7	38	36	16.2	.	36	12.6	46	37	14.5	42
Hulless types:													
Buff Hls	(3)	43	15.7	34	44	18.8	.	39	14.5	44	42	16.3	39
Stark Hls	(6)	37	15.7	40	36	18.4	.	37	14.0	48	36	16.0	44
Paul Hls	(7)	39	17.2	42	41	18.9	.	39	16.7	52	40	17.6	47
Test avg.:		39	15.4	38	38	17.2	.	38	14.0	47			
High-value:		43	17.2	42	44	19.4	.	41	16.7	52			
# LSD(.05):		2	.	3	2	.	.	2	.	3			
## TPG-value:		41	.	39	42	.	.	39	.	49			
### CV:		3	.	6	3	.	.	4	.	4			

* Heading, the relative difference in days to heading, compared to the variety- Don.
\# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 5c. Oat averages for bushel weight, grain protein, and height, western South Dakota locations for 2004.

		Western Location Averages for bu.wt., grain protein, and height						Western Averages			State Avg.		
		Wall			Bison								
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Standard types:													
Don	(1)	40	.	25	35	15.7	26	37	.	25	38	14.5	34
Reeves	(2)	40	.	28	35	14.7	31	37	.	29	38	15.2	40
Hytest	(4)	43	.	30	38	17.5	32	40	.	31	40	17.1	40
Jerry	(5)	41	.	28	36	17.1	29	39	.	28	38	15.3	39
Morton	(7)	39	.	30	35	17.4	30	37	.	30	37	14.5	42
Loyal	(8)	38	.	30	37	15.7	29	37	.	29	36	15.4	41
HiFi	(8)	39	.	28	34	16.3	30	37	.	29	37	14.1	40
Hulless types:													
Buff Hls	(3)	50	.	25	40	18.4	25	45	.	25	44	16.4	36
Stark Hls	(6)	45	.	30	37	19.2	32	41	.	31	39	15.7	40
Paul Hls	(7)	47	.	29	40	20.5	31	43	.	30	41	17.3	41
Test avg.:		42	.	28	37	16.8	30						
High-value:		50	.	31	40	20.5	35						
# LSD(.05):		1	.	2	1	.	3						
## TPG-value:		49	.	29	39	.	32						
### CV:		2	.	6	3	.	7						

* Heading, the relative difference in days to heading, compared to the variety- Don.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 6. Origin, variety traits, and disease reactions for oat entries in 2004.

			--- Traits ---		-- Disease reaction + --				
						-- Rust --		Red	PVP**
Variety	(Hdg.)*	Origin	Ldg. Resis.	Grain Color	Smut	Stem	Crown	Leaf	Status
Standard varieties:									
Don	(1)	IL-85	Good	White	R	MS	S	MR	No
Reeves	(2)	SD-02	Good	White	MR	S	MR-	MR-	No
Hytest	(4)	SD-86	Good	Lt.Cream	MR	MS	MS	MS	No
Jerry	(5)	ND-94	Good	White	-	MS	MR	MS	Yes
Morton	(7)	ND-01	Good	White	-	R	-	-	***
Loyal	(8)	SD-00	Good	White	R	MS	R	S	No
HiFi	(8)	ND-01	Good	White	-	R	MR	-	Yes
Hulless varieties:									
Buff Hls	(3)	SD-02	Good	Hulless	R	S	MS	MR-	No
Stark Hls	(6)	ND-04	Good	Hulless	-	MR	MS	S	***
Paul Hls	(7)	ND-94	Good	Hulless	MS	MR	MS	S	Yes

* Heading, the relative difference in days to heading, compared to Don.
+ R= resistant, MR= moderately resis., MS= mod. susceptible, S= susc.
** Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.
*** PVP application pending or anticipated.

Table 7a. Barley yield results, eastern South Dakota locations, 2003-2004.

		Eastern Location Yield Averages (13% moisture)					
		Brookings		South Shore		Eastern Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Lacey	(1)	97	94	104	76	101	85
Conlon	(1)	81	72	102	79	92	76
Tradition	(1)	88	.	107	.	98	.
Drummond	(3)	86	87	98	72	92	80
Haxby	(3)	95	.	110	.	103	.
Excel	(4)	100	100	103	72	102	86
Robust	(4)	93	94	84	68	89	81
Eslick	(4)	112	.	115	.	114	.
Legacy	(4)	96	.	108	.	102	.
Valier	(5)	101	.	106	.	104	.
Test avg.:		95	90	104	72		
High yield:		112	100	119	79		
# LSD(.05):		^NS	10	10	9		
## TPG-value:		81	90	109	70		
### CV:		13	11	6	5		

* Heading, the relative difference in days to heading, compared to the variety-Lacey.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 7b. Barley yield results, central South Dakota locations, 2003-2004.

		Central Location Yield Averages (13% moisture)							
		Miller		Selby		Brown Co.		Central Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Lacey	(1)	85	.	97	82	112	82	98	82
Conlon	(1)	80	.	75	69	96	67	84	68
Tradition	(1)	84	.	88	.	105	.	92	.
Drummond	(3)	85	.	94	80	99	69	93	75
Haxby	(3)	95	.	77	.	92	.	88	.
Excel	(4)	90	.	97	85	105	76	97	81
Robust	(4)	76	.	76	67	93	72	82	70
Eslick	(4)	97	.	93	.	108	.	99	.
Legacy	(4)	89	.	88	.	117	.	98	.
Valier	(5)	89	.	94	.	99	.	94	.
Test avg.:		87	.	89	77	102	74		
High yield:		97	.	98	85	117	82		
# LSD(.05):		7	.	11	9	11	8		
## TPG-value:		90	.	87	76	108	75		
### CV:		6	.	9	10	8	5		

* Heading, the relative difference in days to heading, compared to the variety- Lacey.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 7c. Barley yield results, western South Dakota locations, 2003-2004.

		Western Location Yield Averages (13% moisture)											
		Wall		Bison		Ralph		Western Averages		State		State Top Yield Percentage$	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	8 Loc 2004	6 Loc 3-Yr
Lacey	(1)	52	44	40	.	62	41	51	43	81	70	75	100
Conlon	(1)	55	48	41	.	59	38	52	43	74	62	50	50
Tradition	(1)	56	.	36	.	58	.	50	.	78	.	50	.
Drummond	(3)	55	42	37	.	60	38	51	40	77	65	50	67
Haxby	(3)	63	.	29	.	58	.	50	.	77	.	63	.
Excel	(4)	58	45	33	.	61	44	51	45	81	70	63	100
Robust	(4)	60	42	25	.	46	32	44	37	69	63	25	33
Eslick	(4)	55	.	49	.	65	.	56	.	87	.	100	.
Legacy	(4)	53	44	40	.	64	45	52	45	82	.	75	.
Valier	(5)	55	.	41	.	65	.	54	.	81	.	63	.
Test avg.:		56	43	36	.	59	39						
High yield:		63	48	49	.	65	45						
# LSD(.05):		^NS	7	10	.	10	7						
## TPG-value:		47	41	39	.	55	38						
### CV:		12	13	18	.	12	15						

* Heading, the relative difference in days to heading, compared to the variety- Lacey.
$ Percent of test locations a variety appears in the top performance group for yield.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 8a. Barley averages for bushel weight, grain protein, and height, eastern South Dakota locations for 2004.

		Eastern Location Averages for bu.wt., grain protein, and height								
		Brookings			South Shore			Eastern Averages		
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Lacey	(1)	48	11.3	35	47	12.1	39	47	11.7	37
Conlon	(1)	49	12.1	32	50	12.3	36	50	12.2	34
Tradition	(1)	48	9.0	36	48	11.7	39	48	10.4	37
Drummond	(3)	48	11.5	35	46	12.0	39	47	11.8	37
Haxby	(3)	51	11.1	34	50	11.4	36	50	11.3	35
Excel	(4)	49	10.5	36	46	11.4	38	47	11.0	37
Robust	(4)	48	11.3	39	46	11.5	41	47	11.4	40
Eslick	(4)	50	10.4	35	48	10.8	35	49	10.6	35
Legacy	(4)	48	10.6	37	45	12.5	39	46	11.6	38
Valier	(5)	52	11.3	35	50	12.3	37	51	11.8	36
Test avg.:		49	10.9	36	48	11.7	38			
High-value:		52	12.1	39	50	12.5	41			
# LSD(.05):		2	.	2	2	.	2			
## TPG-value:		50	.	37	48	.	40			
### CV:		3	.	3	3	.	3			

* Heading, the relative difference in days to heading, compared to the variety- Lacey.
\# LSD, the amount values in a column must differ to be significantly different.
\## TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
\### Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 8b. Barley averages for bushel weight, grain protein, and height, central South Dakota locations for 2004.

		Central Location Averages for bu.wt., grain protein, and height									Central Averages		
		Miller			Selby			Brown Co.					
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Lacey	(1)	49	11.2	35	48	13.2	.	47	13.0	38	48	12.5	36
Conlon	(1)	49	11.5	33	45	12.7	.	49	12.0	36	48	12.1	34
Tradition	(1)	49	11.5	37	47	12.8	.	48	12.2	39	48	12.2	38
Drummond	(3)	48	11.4	36	49	14.2	.	45	14.8	41	48	13.5	39
Haxby	(3)	50	10.5	33	47	14.3	.	50	13.7	36	49	12.8	34
Excel	(4)	48	10.3	37	46	13.0	.	47	11.8	37	47	11.7	37
Robust	(4)	49	11.3	39	47	14.0	.	48	12.8	40	48	12.7	39
Eslick	(4)	49	11.2	31	43	14.9	.	51	13.1	36	48	13.1	33
Legacy	(4)	48	9.9	37	43	14.5	.	48	11.9	38	46	12.1	37
Valier	(5)	50	11.5	34	49	14.8	.	51	13.6	38	50	13.3	36
Test avg.:		49	11.0	35	47	13.7	.	48	13.0	38			
High-value:		50	11.5	39	49	14.9	.	51	14.8	41			
# LSD(.05):		^NS	.	2	2	.	.	2	.	2			
## TPG-value:		47	.	37	47	.	.	50	.	39			
### CV:		3	.	4	4	.	.	3	.	4			

* Heading, the relative difference in days to heading, compared to the variety- Lacey.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 8c. Barley averages for bushel weight, grain protein, and height, western South Dakota locations for 2004.

		Western Location Averages for bu.wt., grain protein, and height									Western Averages			State Avg.		
		Wall			Bison			Ralph								
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Lacey	(1)	43	13.1	19	40	12.9	25	44	11.7	25	42	12.6	23	46	12.3	31
Conlon	(1)	43	12.7	19	41	13.2	22	44	12.1	25	42	12.7	22	46	12.3	29
Tradition	(1)	39	13.4	19	40	13.2	24	42	11.8	26	40	12.8	23	45	12.0	31
Drummond	(3)	42	13.2	20	42	13.0	26	41	12.0	30	42	12.7	25	45	12.8	33
Haxby	(3)	49	13.6	20	38	14.6	23	47	11.6	22	45	13.3	21	48	12.6	29
Excel	(4)	39	12.8	19	40	12.7	23	43	11.3	23	41	12.3	22	45	11.7	30
Robust	(4)	43	13.9	21	42	13.8	26	44	12.1	23	43	13.3	23	46	12.6	33
Eslick	(4)	45	13.4	18	43	12.7	22	46	12.1	23	45	12.7	21	47	12.3	28
Legacy	(4)	40	13.4	21	42	13.1	27	42	11.8	27	41	12.8	25	44	12.2	32
Valier	(5)	47	14.2	20	40	13.3	22	46	12.1	19	44	13.2	20	48	12.9	29
Test avg.:		43	13.1	20	41	13.2	24	44	11.8	24						
High-value:		49	14.2	21	43	14.6	27	47	12.1	30						
# LSD(.05):		2	.	2	NS	.	3	2	.	4						
## TPG-value:		47	.	19	38	.	24	46	.	26						
### CV:		4	.	9	5	.	9	3	.	8						

* Heading, the relative difference in days to heading, compared to the variety- Lacey.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 9. Origin, variety traits, and disease reactions for barley entries tested in 2004.

			Traits#			Disease Reaction+				
Variety	(Hdg.)*	Origin	Ldg. Resis.	Grain Use	Awn Texture	Smut	Stem Rust	Blotch Spot	Blotch Net	PVP** Status
Conlon	(1)	ND-96	G	Malt	SS	S	S	MS	MR	Yes
Lacey	(1)	MN-00	G	Malt	S	S	S	MR	S	Yes
Tradition	(1)	BARI-03	F	Malt	S	S	S	MR	S	***
Drummond	(3)	ND-00	VG	Malt	SS	S	S	R	MS	Yes
Haxby	(3)	MT-02	F	Feed	R	S	-	-	-	Yes
Excel	(4)	MN-90	VG	Malt	S	S	S	MR	S	Yes
Robust	(4)	MN-83	G	Malt	S	S	S	MR	S	Yes
Eslick	(4)	MT-04	F	Feed	R	S	-	-	-	***
Valier	(5)	MT-99	F	Feed	R	S	-	-	-	***
Legacy	(4)	BARI-00	G	Malt	S	S	S	MR	S	Yes

* Heading, the relative difference in days to heading, compared to Lacey.
# E= excellent, G= good, VG= very good, F= fair, P=poor, S= smooth, SS= semi-smooth.
+ R= resistant, MR= moderately resis., M= intermediate, MS= mod. susceptible, S= susc.
** Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.
*** PVP application pending or anticipated.

Table 10a. Hard Red Winter Wheat (HRWW) yield results, western South Dakota locations, 2003-2004.

		Western Location Yield Averages (13% moisture)					
		Wall		Sturgis		Western Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Wendy~W	(-1)	45	39	25	.	35	.
Expedition	(0)	47	39	21	.	34	.
Wesley	(2)	48	41	25	.	37	.
Nekota	(2)	45	39	28	.	37	.
Alliance	(2)	46	41	29	.	38	.
Wahoo	(3)	57	44	26	.	42	.
Jagalene	(3)	52	39	24	.	38	.
Trego~W	(3)	36	34	27	.	32	.
Arapahoe	(3)	40	36	22	.	31	.
Millennium	(4)	47	40	29	.	38	.
Tandem	(4)	51	42	26	.	39	.
Crimson	(5)	48	39	27	.	38	.
Harding	(5)	56	41	27	.	42	.
Jerry	(6)	53	.	29	.	41	.
Test avg.:		49	40	26	.		
High yield:		61	44	30	.		
# LSD (.05):		6	^NS	.	.		
## TPG-value:		55	34	.	.		
### CV:		8	10	18	.		

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 10b. Hard Red Winter Wheat (HRWW) yield results, central South Dakota locations, 2003-2004.

		Central Location Yield Averages (13% moisture)							
		Platte		Pierre		Tripp Co.		Central Averages	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Wendy~W	(-1)	48	57	42	.	50	**47**	47	.
Expedition	(0)	58	59	45	.	40	**39**	48	.
Wesley	(2)	60	62	47	.	39	**37**	49	.
Nekota	(2)	58	58	51	.	47	**41**	52	.
Alliance	(2)	64	58	53	.	51	**44**	56	.
Wahoo	(3)	63	61	53	.	52	40	56	.
Jagalene	(3)	55	59	58	.	60	49	58	.
Trego~W	(3)	59	58	49	.	57	46	55	.
Arapahoe	(3)	57	58	45	.	47	38	50	.
Millennium	(4)	60	61	47	.	55	43	54	.
Tandem	(4)	63	56	53	.	46	41	54	.
Crimson	(5)	57	54	53	.	38	36	49	.
Harding	(5)	72	60	46	.	52	41	57	.
Jerry	(6)	62	.	46	.	40	.	49	.
Test avg.:		61	59	51	.	49	42		
High yield:		76	63	58	.	60	49		
# LSD(.05):		10	^NS	.	.	8	^NS		
## TPG-value:		66	54	.	.	52	36		
### CV:		12	12	18	.	12	13		

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 10c. Hard Red Winter Wheat (HRWW) yield results, eastern South Dakota locations, 2003-2004.

		Eastern Location Yield Averages (13% moisture)									
		Brookings		Highmore		Selby		Eastern Averages		State Avg.	
Variety	(Hdg.)*	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr	Bu/A 2004	Bu/A 3-Yr
Wendy~W	(-1)	86	77	66	48	65	.	72	.	53	54
Expedition	(0)	91	76	62	46	62	.	72	.	53	52
Wesley	(2)	96	80	72	51	58	.	75	.	56	54
Nekota	(2)	86	74	72	49	60	.	73	.	56	52
Alliance	(2)	83	71	75	51	71	.	76	.	59	53
Wahoo	(3)	100	83	78	57	70	.	83	.	62	57
Jagalene	(3)	82	79	73	55	72	.	76	.	60	56
Trego~W	(3)	82	73	68	48	63	.	71	.	55	52
Arapahoe	(3)	79	75	74	54	71	.	75	.	54	52
Millennium	(4)	100	84	74	54	70	.	81	.	60	56
Tandem	(4)	84	72	71	52	65	.	73	.	57	53
Crimson	(5)	80	74	64	48	66	.	70	.	54	50
Harding	(5)	93	80	76	54	68	.	79	.	61	55
Jerry	(6)	106	.	79	.	71	.	85	.	61	.
Test avg.:		91	77	73	52	68	.				
High yield:		106	84	82	57	77	.				
# LSD(.05):		16	^NS	8	5	7	.				
## TPG-value:		90	71	74	52	70	.				
### CV:		13	12	8	9	7	.				

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
^ Values within a column do not differ significantly (.05 level of probability).
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum value required for the top performance group for yield.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 11a. Hard Red Winter Wheat averages for bushel weight, grain protein, and height, western South Dakota locations, 2002-2004.

		Western Location Averages for bu.wt., grain protein, and height						Western Averages		
		Wall			Sturgis					
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Wendy~W	(-1)	62	14.8	.	59	16.6	.	61	15.7	.
Expedition	(0)	63	15.0	.	60	16.2	.	61	15.6	.
Wesley	(2)	62	15.3	.	56	16.9	.	59	16.1	.
Nekota	(2)	63	14.8	.	58	16.3	.	60	15.6	.
Alliance	(2)	63	14.1	.	58	14.5	.	61	14.3	.
Wahoo	(3)	62	14.4	.	57	15.8	.	59	15.1	.
Jagalene	(3)	63	14.9	.	60	16.2	.	61	15.6	.
Trego~W	(3)	62	14.7	.	60	15.5	.	61	15.1	.
Arapahoe	(3)	61	15.5	.	56	16.9	.	59	16.2	.
Millennium	(4)	63	14.4	.	58	15.4	.	61	14.9	.
Tandem	(4)	63	15.5	.	60	17.4	.	62	16.5	.
Crimson	(5)	61	14.2	.	58	18.0	.	59	16.1	.
Harding	(5)	62	14.2	.	54	16.7	.	58	15.5	.
Jerry	(6)	62	14.7	.	54	17.1	.	58	15.9	.
Test avg.:		62	14.8	.	57	16.5	.			
High-value:		64	15.9	.	60	18.0	.			
# LSD(.05):		1	.	.	2	.	.			
## TPG-value:		63	.	.	58	.	.			
### CV:		1	.	.	2	.	.			

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
\# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 11b. Hard Red Winter Wheat averages for bushel weight, grain protein, and height, central South Dakota locations, 2002-2004.

		Central Location Averages for bu.wt., grain protein, and height									Central Averages		
		Platte			Pierre			Tripp Co.					
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Wendy~W	(-1)	61	11.2	.	60	15.6	.	59	12.9	.	60	13.2	.
Expedition	(0)	61	10.8	.	61	15.8	.	58	12.9	.	60	13.2	.
Wesley	(2)	60	11.1	.	59	16.1	.	55	15.0	.	58	14.1	.
Nekota	(2)	60	9.5	.	60	15.3	.	57	12.9	.	59	12.6	.
Alliance	(2)	60	10.8	.	59	14.5	.	57	16.7	.	59	14.0	.
Wahoo	(3)	60	9.1	.	59	15.8	.	55	14.0	.	58	13.0	.
Jagalene	(3)	62	12.0	.	61	15.7	.	58	13.8	.	60	13.8	.
Trego~W	(3)	62	8.9	.	62	14.7	.	59	12.5	.	61	12.0	.
Arapahoe	(3)	60	12.8	.	58	17.1	.	56	14.3	.	58	14.7	.
Millennium	(4)	61	11.2	.	60	15.3	.	57	13.5	.	59	13.3	.
Tandem	(4)	60	9.7	.	61	15.1	.	59	13.3	.	60	12.7	.
Crimson	(5)	63	9.0	.	62	16.9	.	54	14.0	.	60	13.3	.
Harding	(5)	61	9.4	.	60	16.4	.	55	14.9	.	59	13.6	.
Jerry	(6)	60	9.0	.	57	16.3	.	56	14.3	.	58	13.2	.
Test avg.:		61	10.4	.	60	15.7	.	57	13.9	.			
High-value:		63	13.0	.	62	17.1	.	59	16.7	.			
# LSD(.05):		1	.	.	1	.	.	2	.	.			
## TPG-value:		62	.	.	61	.	.	57	.	.			
### CV:		1	.	.	2	.	.	3	.	.			

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 11c. Hard Red Winter Wheat averages for bushel weight, grain protein, and height, eastern South Dakota locations, 2002-2004.

		Eastern Location Averages for bu.wt., grain protein, and height									Eastern Averages			State Avg.		
		Brookings			Highmore			Selby								
Variety	(Hdg.)*	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.	Bu. wt. Lb.	Prot. %	Ht. in.
Wendy~W	(-1)	59	12.0	.	58	12.1	.	58	12.0	.	58	12.0	.	60	13.4	.
Expedition	(0)	62	11.3	.	59	11.4	.	58	10.8	.	60	11.2	.	60	13.0	.
Wesley	(2)	60	11.6	.	57	12.6	.	54	12.5	.	57	12.2	.	58	13.9	.
Nekota	(2)	60	11.1	.	58	11.2	.	57	11.4	.	58	11.2	.	59	12.8	.
Alliance	(2)	61	8.9	.	58	10.4	.	57	11.2	.	59	10.2	.	59	12.6	.
Wahoo	(3)	60	11.2	.	60	12.1	.	56	11.6	.	59	11.6	.	58	13.0	.
Jagalene	(3)	61	11.1	.	60	11.6	.	60	10.9	.	60	11.2	.	61	13.3	.
Trego~W	(3)	62	10.8	.	61	10.8	.	59	10.2	.	61	10.6	.	61	12.3	.
Arapahoe	(3)	59	11.7	.	57	11.9	.	58	12.6	.	58	12.1	.	58	14.1	.
Millennium	(4)	61	11.5	.	59	11.9	.	58	11.1	.	59	11.5	.	60	13.0	.
Tandem	(4)	61	11.8	.	59	12.7	.	58	11.1	.	59	11.9	.	60	13.3	.
Crimson	(5)	61	10.9	.	60	12.8	.	58	10.8	.	60	11.5	.	60	13.3	.
Harding	(5)	61	12.0	.	58	12.3	.	58	12.2	.	59	12.2	.	59	13.5	.
Jerry	(6)	59	10.8	.	58	11.9	.	57	11.6	.	58	11.4	.	58	13.2	.
Test avg.:		60	11.5	.	58	11.8	.	58	11.5	.						
High-value:		63	12.7	.	61	12.8	.	60	13.2	.						
# LSD(.05):		1	.	.	1	.	.	1	.	.						
## TPG-value:		60	.	.	60	.	.	59	.	.						
### CV:		1	.	.	1	.	.	1	.	.						

* Heading, the relative difference in days to heading, compared to the variety- Expedition.
\# LSD, the amount values in a column must differ to be significantly different.
TPG-value, the minimum or maximum value required for the top performance group.
Values that are underlined are in the top performance group for a given column.
Coef. of variation, a measure of trial experimental error; 15% or less is best.

Table 12. Origin, variety traits, and disease reactions for winter wheat entries tested in 2004.

			Traits#				Disease Reaction +				
				End-	Wntr	Cole-	Wht			Rust $	
Variety	(Hdg.)*	Origin	Ldg Res	Use Qlty	Hardy Rtg	optile Pct##	Strk Msc	Tan Spot	Str	Lf	Stm	PVP*
Wendy~W	(-1)	SD-04	E	GN	E	67	MS	R	R	MS	MR	***
Expedition	(0)	SD-02	F	EB	G-E	88	S^	MS	MS	MS	R	***
Alliance	(2)	NE-93	G	AB	G	76	MS	VS	MR	S	MS	Yes
Nekota	(2)	NE/SD-94	G	GB	G	87	MS	MR	S	S	MR	No
Wesley	(2)	NE-98	E	AB	G-E	79	S	MR	MR	MS	R	No
Arapahoe	(3)	NE-88	F	GB	G-E	83	S	S	MS		MR	Yes
Trego~W	(3)	KS-99	F-G	EB	F-G	80	S	MS	S	MR	R	Yes
Wahoo	(3)	NE/WY-01	G	-	G	91	S	-	MR	S	R	Yes
Jagalene	(3)	AW-02	E	-	G	92	MS	MR	MR	MR	MR	Yes
Millennium	(4)	NE-99	G	AB	F-G	78	S	MS	MR	MS	MR	Yes
Tandem	(4)	SD-97	F-G	EB	G	112	S	S	MR		MR	Yes
Crimson	(5)	SD-97	G	GB	G-E	110	MR	R	MR		MS	Yes
Harding	(5)	SD-99	F-G	AB	E	100	MR	MR	MS	MR	MR	Yes
Jerry	(6)	ND-01	F	GB	E	92	MS	-	MR		R	No

* Heading, the relative difference in days to heading, compared to Expedition.
~ W Hard white wheat variety.
# E= exc., A= accept., F= fair, G= good, P= poor, B=baking, and N=noodle
##Percent of Harding (3-1/4" long).
+ R= resistant, MR= moderately resist., MS= mod. susceptible, S= susc., VS= very susc.
$ Rusts: Stripe (str), leaf (lf), and stem (stm).
** Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.
*** PVP application pending or anticipated.

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